C - 6.6

Venus Entry Probe, an ESA Technology Reference Mission

M.L. van den Berg , P. Falkner, A.C. Atzei, A. Peacock

Science Payload & Advanced Concepts Office, European Space Agency, ESTEC, P.O. Box 299, 2200 AG Noordwijk, The Netherlands

email: MvdBerg@rssd.esa.int

The Venus Microsat Explorer Programme is one of ESA's Technology Reference Missions (TRM). The purpose of the TRMs is to focus on the development of strategically important technologies of likely future relevance for scientific missions. This is accomplished through the study of several technologically demanding and scientifically interesting missions, which are, although not part of the ESA science programme, able to provide focus to future technology requirements. Key technological objectives for future planetary exploration are the use of small spacecraft (< 200 kg) with a highly miniaturized and highly integrated payload suite including in- situ probes. The low resource spacecraft allow a phased strategic approach for exploration, thus reducing mission risks compared to a single heavy resource mission.

The aim of the Venus Microsat Explorer Programme is to study approaches to in-situ measurements of the atmosphere using micro-aerobots. The micro-aerobot consists of a long- duration balloon, that will analyze the Venusian middle cloud layer at an altitude of 55 km, where the environment is relatively benign (T = 20 °C and p = 0.45 bars) compared to the surface where the pressure and temperature is about 100 bar and 460 °C respectively. The balloon will deploy a swarm of active ballast probes, which determine vertical profiles of the properties of the lower atmosphere. In addition to improving the understanding of the atmospheric properties and dynamics, the mission will also analyze the unidentified particles in the middle cloud region that might have a biological origin.

The mission profile consists of two microsats. The first satellite enters low Venus orbit. It deploys the aerobot (~ 25 kg) and contains a remote sensing payload suite dedicated to support the in-situ measurements by the aerobot. The second microsat enters deep elliptical orbit and operates primarily as a data relay, data processing and overall resource allocation satellite. The aerobot deployment sequence that is currently envisaged consists of a ballistic entry, followed by an airbrake phase and a main parachute deployment. Deployment of the balloon will be initiated by the release of the main parachute. An overview of the overall mission design will be presented and as well as the results of a

An overview of the overall mission design will be presented and as well as the results of a feasibility study. Critical technologies will be identified and approaches on how to address them will be discussed.